

REMARKS

Claims 16-23, 25-32, 34-40, and 42-45 are pending in the application. Independent claims 16, 29, and 38 have been amended to incorporate the subject matter of claims 24, 33, and 41, which have been canceled without prejudice. The amendments are fully supported by the application as originally filed (see, e.g., specification at page 9, lines 9-11).

As amended, independent claims 16, 29, and 38 recite a heat dissipating structure for a semiconductor package including a flat portion, where "at least a peripherally-situated recess is formed on a top surface of the flat portion" (see, e.g., claim 16). Referring to FIG. 4, "a peripherally-situated recess 235 is formed on a top surface 230a of a flat portion 230 of a heat sink 23" (specification at page 9, lines 9-11).

Applicant's claimed *heat dissipating structure* further includes a plurality of support portions formed at edges of the flat portion for supporting the flat portion in position above a chip, where the support portions are mounted on a predetermined area of a substrate that is free of interference with the chip, passive components, and conductive elements.

Because at least a "peripherally-situated recess" is formed on the flat portion of the Applicant's claimed heat dissipating structure, encapsulating materials can be prevented from flashing over a top surface of the heat dissipating structure, thereby improving heat dissipation efficiency of the semiconductor package (see specification at page 5, lines 14-21; and page 9, lines 9-15). Such an arrangement also may increase space on the substrate for receiving additional passive components, bonding wires, and chips.

Claims 16-45 were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 5,736,785 to Chiang et al. ("Chiang") in view of "Applicant's admitted prior art" (hereinafter "AAPA"). This rejection is respectfully traversed.

The proposed combination of Chiang in view of AAPA does not teach or suggest a heat dissipating structure for a semiconductor package in which the heat dissipating structure includes a flat portion and a plurality of support portions, where at least a peripherally-situated recess is formed on a top surface of the flat portion.

On pages 3-4 of the Office Action of 02/21/2006, regarding claims 24, 33, and 41 (now incorporated into independent claims 16, 29, and 38, respectively), it was alleged that Chiang discloses: "a peripherally situated recess formed between the adjacent raised portions 116d is formed on the top surface of the flat portion (see Fig. 4E)" (Office Action at page 4, lines 2-4).

Referring to FIG. 4E of Chiang, and the top views of FIGS. 4B-4C, four raised hemispherical portions 116d are provided on the top surface of the heatspreader 116 (cited as allegedly corresponding to Applicant's claimed "flat portion"), the hemispherical portions 116d being located "adjacent to the die 102 for connecting to the body package 112 to serve as third supporters" (column 4, lines 61-64 of Chiang).

However, there is no teaching or suggestion of a "peripherally-situated recess" formed on the top surface of the heatspreader 116 in Chiang.

As shown in the top views of FIGS. 4B-4C of Chiang, the four hemispherical portions 116d protrude above the top surface of the heatspreader 116 so as to connect the heatspreader 116 to the body package 112 (see column 4, lines 61-64). In other words, the four hemispherical portions 116d create a buffer space between the top surface of the heatspreader 116 and the package body 112 (see, e.g., FIG. 4A), such that the top surface of the heatspreader 116 is not exposed to outside of the package body 112.

There is simply no teaching or suggestion of any "peripherally-situated recess" formed on the heatspreader 116 in Chiang.

In contrast, the Applicant's claimed invention requires a "peripherally-situated recess" to be formed on the top surface of a flat portion. For example, as shown in FIG. 4 of the application, the peripherally-situated recess 235 is formed on the top surface 230a of the flat portion 230, which can prevent flashing of encapsulating materials over the top surface of the heat dissipating structure.

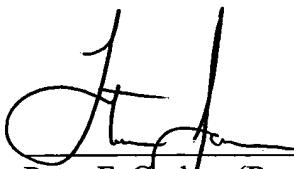
The heatspreader 116 of Chiang does not include the Applicant's claimed "peripherally-situated recess," and is not capable of preventing resin flash. Further, Chiang discloses a complicated arrangement for supporting the heatspreader 116, including four trapezoid-shaped first supporters 116f, four hemispherical downward projections 116c, and the four hemispherical raised portions 116d, which results in a complicated layout that may interfere with an underlying chip, bonding wires, and passive components.

Therefore, even if AAPA were somehow combined with Chiang, the proposed combination would not teach or suggest at least a peripherally-situated recess formed on a top surface of a flat portion of a heat dissipating structure.

For at least the reasons discussed above, the proposed combination of Chiang in view of AAPA does not render obvious the Applicant's claimed invention.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



Peter F. Corless (Reg. No. 33,860)
Steven M. Jensen (Reg. No. 42,693)
Edwards Angell Palmer & Dodge
P.O. Box 55874
Boston, MA 02205

Date: August 18, 2006

Phone: (617) 439-4444

Customer No. 21874